

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
12 September 2008 (12.09.2008)

PCT

(10) International Publication Number
WO 2008/108830 A3

(51) International Patent Classification:

A61K 39/09 (2006.01) C07K 14/315 (2006.01)

(21) International Application Number:

PCT/US2007/022838

(22) International Filing Date: 30 October 2007 (30.10.2007)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/855,114 30 October 2006 (30.10.2006) US

(71) Applicant (for all designated States except US): **NOVARTIS AG** [US/US]; c/o Novartis Vaccines And Diagnostics Inc., P.O. Box 8097, Emeryville, CA 94622-8097 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **SCARSELLI, Maria** [IT/IT]; C/o Novartis Vaccines & Diagnostics, Inc., P.O. Box 8097, Emeryville, CA 94608-8097 (US). **BENSI, Giuliano** [IT/IT]; c/o Novartis Vaccines & Diagnostics, Inc., P.O. Box 8097, Emeryville, CA 94608-8097 (US).

GRANDI, Guido [IT/IT]; Chiron S.r.l., Via Fiorentina 1, I-53100 (IT).

(74) Agent: **HEMMENDINGER, Lisa, M.**; **BANNER & WITCOFF, LTD.**, 1100 13th Street, N.W., Suite 1200, Washington, DC 20005-4051 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),

[Continued on next page]

(54) Title: IMMUNOGENIC AND THERAPEUTIC COMPOSITIONS FOR *STREPTOCOCCUS PYOGENES*

FIG. 3

Signal sequence ■ Domain 1 □ Domain 2 ■ Domain 3 ■ Domain 4

- aa 1-31 (blue line) correspond to the predicted signal sequence
- aa 1-99 are not present in the Perfringolysin O sequence (see homology above)
- Peptides underlined in black were identified by surfome analysis in SF370-M1 (pep1 and pep2) and in 3650-M6 (pep3) strains

- > pep1: 36-QNTASTETTTTNEQPKPESELTEK-61
- > pep2: 155-NINTTPVDISIDSVTD-172
- > pep3: 450-TEYVETTSTEY-460

```

1  MSNKKTFKKY SRVAGLLTAA LIIGNLV TAN AESNKQNTAS TETTTTNEQP pep1
51  KPESSELTE KAGQRTDDML NSNDMIK LAP KEMPLES A EKKS EDDKKK
101  SEEDHTEIN DKYISLNYNE LEVLA RNET IENFVPKEGV KKADKEIVIE
151  RKKNINPTVDISIDSVT DRTPAALQL ANKGFTENKP DAVVTKRNPQ pep2
201  KIHIDLP G MG DKATVEVNDP TYANVST AID NLVNQWHDNY SGGNTLP AR
251  KMPSSNVAEK SQPEZALNUN ECHMPCVCE DFESEKCEK KMTLVAK QI
301  FYTVSANLPN NPADVFDKSV TFKELQ RGV SNEAPPLFVS NVAYGR VTP
351  KLEHDSKND VETASAEK QDVATNGKQ SPILLNSSTP AVVLCRPAK
401  KKKVWEDPD VERNVZEDN TFSRKNPAYP ISYTSVFLKN NKIAGVNNRT pep3
451  EYVETTSTEY ASGGINLSHQ GATVAQYETD WDEINVDKQ KEMVTKGRW
501  NNMSRTSPY SWVPEGANE RNRERIMAREC VGLAWETWRK VADERDVKLS
551  KATNVA SCS QLSFYGSSTYK

```

(57) Abstract: Compositions for preventing and/or treating *S. pyogenes* infection which comprise one or more active agents. The active agents are SLO antigens, nucleic acid molecules encoding the SLO antigens, and/or antibodies which selectively bind to the SLO antigens.



European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

— *with sequence listing part of description published separately in electronic form and available upon request from the International Bureau*

Published:

- *with international search report*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:

30 October 2008

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2007/022838

A. CLASSIFICATION OF SUBJECT MATTER
INV. C07K14/315 A61K39/09

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
C07K A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, BIOSIS, EMBASE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>WO 2006/042027 A (CHIRON CORPORATION) 20 April 2006 (2006-04-20) page 7, paragraph 43 - page 9, paragraph 50 page 11, paragraph 60 page 14, paragraph 70 - page 18, paragraph 79 page 19, paragraph 87 - page 27, paragraph 110 page 30, paragraph 121 - page 70, paragraph 280; example 5 Tables 1-3; 7, 16; Antigen GAS 25; SEQ ID NOs:296, 297 claims</p> <p>----- -/--</p>	1-15

☒ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *Z* document member of the same patent family

Date of the actual completion of the international search

2 September 2008

Date of mailing of the international search report

10/09/2008

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Montero Lopez, B

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2007/022838

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 93/05156 A (BECKMAN INSTRUMENTS, INC.) 18 March 1993 (1993-03-18) page 2, line 3 - line 16 page 10, line 25 - page 11, line 6; example 8; sequence 2 -----	1,2
A	US 5 700 648 A (KEHOE MICHAEL [GB] ET AL) 23 December 1997 (1997-12-23) column 2, line 8 - line 31 column 2, line 44 - column 3, line 8 column 8, line 25 - column 9, line 12 -----	1-15
A	GB 2 233 977 A (KEHOE MICHAEL; PINKNEY MICHAEL) 23 January 1991 (1991-01-23) the whole document -----	1-15
A	US 5 354 846 A (KEHOE MICHAEL [GB]) 11 October 1994 (1994-10-11) column 2, line 23 - line 40 column 3, line 46 - column 4, line 32 page 6, line 14 - line 38; figure 1 -----	1-15

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2007/022838

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 2006042027	A	20-04-2006	AU 2005294275 A1 CA 2583803 A1 EP 1807446 A2	20-04-2006 20-04-2006 18-07-2007
WO 9305156	A	18-03-1993	AT 159293 T AU 661028 B2 AU 2437292 A CA 2094245 A1 DE 69222749 D1 DE 69222749 T2 EP 0555439 A1 ES 2110009 T3 JP 6503003 T JP 3595840 B2 US 5378620 A	15-11-1997 13-07-1995 05-04-1993 01-03-1993 20-11-1997 26-02-1998 18-08-1993 01-02-1998 07-04-1994 02-12-2004 03-01-1995
US 5700648	A	23-12-1997	NONE	
GB 2233977	A	23-01-1991	NONE	
US 5354846	A	11-10-1994	NONE	